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## **PROMOTING FRUIT CONSUMPTION THROUGH GRANOLA BARS OF A TROPICAL FLAVOUR**

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### **ABSTRACT**

*The purpose of this research was to offer an alternative snack to school students with the introduction of granola bars that were made of famous local fruit, jackfruit. It was discovered that most school students preferred to eat unhealthy snacks and consumed less healthy meals such as vegetables and fruits. Hence, these granola bars were introduced as a healthier snack for them as a*

*way of mitigating their obsession with snacks with fewer nutrients and higher calories. Jackfruit used as the main ingredient of this granola bar to offer a new flavour that the students might find very familiar and appealing as well as to promote these tropical fruits among the locals and possibly, tourists and foreign visitors. The subjects for this study were 30 respondents from a local neighbourhood who sampled this granola bar and rated it based on a specific set of criteria. Their opinions were analysed to study their level of approval of this snack. The findings showed that the respondents had positive responses on the product and some offered constructive feedback on how to commercially improve the product. It could be deduced that the jackfruit granola bar has the potential to be marketed as a healthy snack. However, more research should be done in determining how effective this product could be in tackling obesity among school teenagers.*

### **Keywords**

Jackfruit, Granola Bars, Snack, Obesity

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## **1. Introduction**

Malaysians consume fewer fruits than the recommended amount which can be worrying since fruit consumption, along with eating vegetables, is pivotal in maintaining a healthy lifestyle and lower the risk of illnesses. The Federal Agricultural Marketing Authority also is known as FAMA (Chern, 2019) discovered that the average Malaysian only consumed 120gm of fruits daily and this was below the number of fruits that World Health Organization (WHO) recommended us to take which was 146kg a year. As a result of this, the association aimed to promote healthy eating habit among school students. Healthy Ministry (Bernama 2017) revealed that over 80 per cent Malaysians did not regularly take fruits and vegetables. This implied a deteriorating dietary style among the people. The ministry urged Malaysians to consume more fruits to help tackle obesity and other health-related ailments.

The concept of food innovation practised by food industry suggests that fruits can be turned into products that can attract more people to consume it. National University of Malaysia (Centre for Communication) argued that fruit intake can reduce the risk of many illnesses particularly heart diseases, hypertension, strokes and cancer. The university explained that fruits and vegetables can be processed into innovative products that were more appealing such as juices and bars. This research project aimed to identify the effects of granola bar blended with fruit that is native to the island and the region, jackfruits.

## **2. Problem Statement**

Malaysians consume high carbohydrate food than ever especially in the urban areas where fast-food restaurants have sprung up in every corner. According to Norsyahidah (2016), Malaysians in urban areas have become too dependent on fast food restaurants that serve cooked, processed and ready-to-eat meals with limited or no fruits or vegetables. Norimah et al. (2008) argued that Malaysians are unaware of the vast benefits of fruits and vegetables.

Geographical and socioeconomic variables heavily influence children's awareness of the nutritious and health values of eating fruits, along with vegetables, as well as their intake of this food. Shah An Ali, Mohd Nazir and Abdul Manaf (2020) discovered in their research that children of indigenous backgrounds like Malay who lived in the urban areas had more awareness of the health benefits of fruits and vegetables than those who lived in the rural areas. It was also found that children from low-income families had a low intake of fruits and vegetables.

Teenagers in the rural area of the Malaysian state, Sabah, exhibited a similar tendency to most adults and children in the country as they consumed fewer fruits than the recommended amounts. This might be attributed to several factors such as geographical and socioeconomic factors since most of them came from families of low incomes and they had limited access to fresh fruits and vegetables. Due to these factors, fruits and vegetables could be slightly expensive for these families. Most food sold in schools, markets and restaurants were greasy products with high calories that posed health risks to those who consumed this regularly.

Therefore, this research project would like to examine the potential of food innovation, jackfruit granola bar, as an alternative option that may help increase young adults' intake of fruits.

## **3. Research Objectives**

The main goal of this research project was to examine the potential of this jackfruit granola bar by analysing the level of acceptance that the target population had on this food innovation. These could be broken into three main objectives:

1. To encourage the target population, teenagers and adults, to consume fruits to improve their dietary styles by introducing a granola bar of a tropical flavour.
2. To analyze the target group's level of approval on this food innovation.

## **4. Eating in the Absence of Hunger**

Faith, et al. (2006) proposed that eating in the absence of hunger (EAH) is a form of disinhibited eating that might lead to obesity among children who are more vulnerable to excessive consumption of calories than any other group. Birth, Fisher and Davidson (2003) explained that

children tend to consume additional calories by binging on snacks after their main meals. It was argued that controlling children's eating schedule and amount of food to be eaten during their mealtimes without letting them to naturally respond to their hunger and satiety might be harmful. It could disrupt their ability to self-regulate their eating habit which eventually developed into disinhibited eating (Rollins, Savage, Fisher, & Birch, 2015). Parents who pressure their children to eat beyond their satiety might influence the children to develop eating routines where they exceed the recommended intake of calories on daily basis. This might remain persistent as they enter adolescence, where they become more conscious over their appearance and obesity, affects not just their physical health but also their self-esteem (Remy, Issanchou, Chabanet, Boggio, & Nicklaus, 2015). It was believed that many school teenagers who were at risk of developing obesity were influenced by their childhood experience of being pressured to eat even though they were not hungry or did not have a desire for food during the time they received the nudge to do so.

## **5. Fruit Consumption among Malaysians**

Malaysians' fruit intake appeared to be declining gradually that it was below the recommended amounts on regular basis. Institute for Public Health (2015) found that fruit consumption among Malaysian adults declined from over 14% in 2011 to 9% in 2015 and a study on young adults in the country indicated that majority of them, 68%, took fruit lower than the national recommendation. Another research revealed that 90% failed to take adequate amounts of fruit. There are many benefits of fruit consumption and one of the major benefits is the reduction of obesity (Weerts & Amoran, 2011). However, Clemens et al. (2015) claimed that fruit juice might contain more sugar and people are not recommended to substitute eating actual fruits with drinking fruit juices. This implied that any companies that are experimenting on food innovations that are based on fruits should consider their nutritious content and the possible health risks before recommending it as a healthy alternative.

Many factors influence people to eat fruits. Saba et al. (2010) cited sensory appeal like the appearance and smell of food products is an important determinant of a person's preference (Stewart-Knox et al., 2015). Mal (2014) singled out time constraint and familiarity as huge factors for people's selection of food as they preferred to consume something that required less preparation time and it was likely that they chose fruits that they were more familiar with. Othman et al. (2012) explained several factors like attitude, habit, social influences and availability of fruits might have a greater influence on people's fruit intake while Thomson and Ravia (2011) attributed the increase of fruit intake to social marketing. Since this project sought to explore the potential of granola bars

blended with a famous tropical fruit that is native to specific areas in Asia, there are various ways of how this food product can influence people to consume it.

## **6. Healthy Snack as an Alternative**

There has been a recommendation on manufacturing and marketing healthier snacks as an alternative to satiate the craving that majority of people have on consuming snacks on regular basis. Kong (2011) proposed that snack meals can be a source for the complementary intake of fruit, vegetables and fibre-rich food if they are taken within a well-controlled snacking pattern. According to the reports from Healthy Returns (2018), the move towards healthier snacks is a more practical solution for low-income families since snack consumption plays a role in meeting the needs of such families for the affordable intake of calories. Food producers in the UK had been advised to reformulate their food products like confectionery and biscuits to contain less sugar (Public Health England, 2018). This justified the experiment on the potential production and marketing of granola bars with less sugar and healthier content to cater to the majority of adolescents' habits of taking snacks.

## **7. Granola Bars**

A granola bar is made of granola mixed with other ingredients like syrup, oats and nuts that are pressed, baked and shaped like bars and it is considered a convenient snack food or breakfast food (Weeks, 2019). Due to its content, this food may offer many health benefits. It can reduce inflammation, improve the level of blood pressure, stabilize the level of cholesterol, level of blood sugar, and help maintain gut health. It also helps in controlling appetite. However, it is also important to take note of several caveats since granola can be high in calories with added fats and sugars (Mandl, 2019). This research project added one main ingredient into this popular snack, jackfruit, and attempted to elicit people's opinions on the taste, the texture and its commercial potential.

## **8. Jackfruits**

The jackfruit is native to Asian regions particularly in India and Malaysia (Morton, 2016). It contains a variety of nutrients and it has many health benefits that include the controlled level of blood sugar, protection against diseases and improved heart health (Healthline). Jackfruits are seasonal fruits that are usually available during a certain period of times in a year.

Nurul Izzah et al. (2012) ranked banana and apples as the two most consumed fruits by Malaysians. These two were followed by watermelons, oranges, papayas, mangos and pears. Some

tropical fruits that are native to Asia are only available during their seasons, it was discovered that durians, rambutans, jackfruits, dokongs and mangosteen were the most consumed local fruits. Despite the low price of these fruits during their peak seasons, the price did not influence the locals' preferences of these fruits over others. This implied that the locals had little interest in local fruits. This might be attributed to several factors; the limited availability of the fruits, the lack of promotion of these fruits that might be overshadowed by durians that are very popular among locals and the scarcity of food innovations from these fruits that are commercially successful. Hence, this research project experimented with granola bars by blending the essence of the sought-after tropical jackfruit into this snack.

## **9. The Making of Jackfruit Granola bars**

These were the ingredients and procedure on how to bake granola bars with jackfruit as its main ingredients.



**Figure 1:** *The Ingredients of the Jackfruit Granola Bar*

The ingredients were 100 grams of dried jackfruit, 100 grams of almond and sunflower seeds, 100 grams of butter, 150 grams of honey, 4 teaspoons of vanilla extract, 150 grams of brown sugar, 200 grams of oats and 50 grams of shredded coconut. There were nine main steps on how to prepare this granola bar.

- 1) Preheat oven to 170c



**Figure 2:** *The Second Step*

- 2) Cut dried jackfruit and almonds into smaller pieces



**Figure 3: The Third and Fourth Step**

- 3) Melt butter in a large saucepan and pour honey, vanilla extra and brown sugar into it
- 4) Stir it properly until these ingredients become well-blended



**Figure 4: The Fifth Step**

- 5) Add oats, chopped nuts, dried jackfruits and coconut shreds into the mixture and blend it properly



**Figure 5: The Sixth Step**

- 6) Line a baking pan with a parchment paper and pour the mixture into it
- 7) Bake in preheat oven at 170c for 20 minutes or until the mixture turns golden brown
- 8) Allow it to cool for approximately 15 - 20 minutes



**Figure 6:** *The Final Step*

- 9) Cut baked oats into bars

## 10. Methodology

The target group was approximately 30 respondents from a rural neighbourhood in Keningau, one of the districts located in the interior region of the state. The main instrument was a set of questions that these respondents answered after they were required to sample the granola bars. The purpose of this instrument was to analyse the target population by eliciting their ratings on seven criteria. The ratings were assigned into four categories. The first two categories (1 and 2) indicated disapproval while the next two categories (3 and 4) signified approval. If more than 50 percent of the respondents rated one category over the other, the category would be considered as the perception of the majority.

## 11. Findings

The findings from the survey were used to analyse the public perception of this snack. The survey contained four levels of agreement: strongly disagree (1), disagree (2), agree (3) and strongly agree (4). This could illustrate to what extent the target group approved each aspect of the granola bar that they were required to evaluate.

**Table 1:** *Results of the Questionnaires*

No	Statement	Levels of agreement.			
		1	2	3	4
1.	Ideal portion		4	21	5
2.	Ideal flavour			20	10
3.	An ideal blending of jackfruit with the rest of the ingredients		1	14	15



4.	Ideal texture	1	2	17	10
5.	Ideal appearance			18	12
6.	Appealing colouring		2	17	11
7.	Appealing aroma		1	16	13

Two main features of the food product received approval from all 30 respondents while there was at least one person expressed an unfavourable view on the other features of the jackfruit tropical fruit. Four respondents did not favour the portion of the bar and three did not find the texture of the product as ideal. Overall, majority of the respondents seemed to have positive opinions on the different evaluation aspects of the granola bar.

It could be deduced from the findings from the survey, all respondents expressed their approval on the flavour, and appearance of the jackfruit bars. Some of the respondents did not find the portion, the colour, the aroma and how well that the jackfruit flavour satisfactory. It could also be deduced that the texture of the bars still needed to be improved.

There were a few suggestions from the respondents on how to improve this product. One of the suggestions highlighted the need to reduce the amount of sugar in the product in line with the amount of sugar that healthy bars available in the market usually has. Few commented that the granola bars should be made more appealing for children since it could substitute the unhealthy food that children tend to snack on. Many claimed that a variety of ingredients such as nuts and fruits could improve the taste of the bars.

According to a research made by Letona, et al. (2014), they found out that children prioritized taste in selecting which snack they would like to buy and a specific ingredient associated with the taste serves as the main reason they choose this particular snack. Based on Elliot 2009, children preferred certain snacks due to its specific ingredients like chocolate, cheese and grape. The responses from the target population revealed their high level of approval on the taste of the jackfruit in the granola bars. Thus, school students might prefer this granola bar over other snacks if the main ingredient, jackfruit, is successfully marketed as its novelty.

It was discovered that Elliott and Brierley (2012) that visual elements of snack packaging played a vital role in children's choice as the majority of them cited drawings, characters and combination of colours as the main features that they considered in choosing their snacks. This corroborated the findings from the survey where many of the respondents suggested that the appearance of the food product should be improved to make it more appealing to children. However, they also argued that it was likely that children would not choose snacks that displayed

fruits or vegetables on the packaging since they associated this with sourness. Therefore, the packaging and appearance of this jackfruit granola bar should be filled with colours, drawing and perhaps a character. While the main ingredient, jackfruit, should be highlighted as children tend to associate specific ingredients with favourable taste, the packaging should be designed in a way that the fruit is optimally presented.

## **12. Conclusion**

The findings of this research indicated that the locals or at least students and teachers might have strong approval on food innovations that are based on plants native to their regions as evidenced by their high level of approval on every aspect of the granola bar. The findings which showed how the respondents were more interested in the taste and appearance of the bar seemed consistent with what Letona, et al. (2014) discovered in her research that children made their decisions on which snack to eat based on taste and visual elements. With major improvements on the flavour of the jackfruit granola bar, along with its appearance and packaging, the snack might have commercial potential to be marketed to the locals and by extension, tourists. If this proves to be commercially viable particularly among the target population which is school teenagers, there is a possibility that most teenagers will choose this as their regular snack. This might reduce their intake of other unhealthy snacks and subsequently, prevent them from becoming obese. However, there are many other factors that need to be considered in tackling obesity among teenagers in order to attain a practical and comprehensive solution.

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